

Claims

1. Device (V) for dynamic storage of objects (G) along a conveying section (F) between an input station (E) and an output station (A) with an endless, flexible conveying means (1), which is variably subdivided into a conveying strand (1a) and an idle strand (1b), where the conveying strand and the idle strand each present areas of variable lengths, which move in opposite direction, with at least one carriage (2), which can be moved in the plane of conveyance, for changing the storage capacity, which carriage presents a first deflection (3) for the conveying strand and a second deflection (4) for the idle strand, as well as with a first drive device (7) for the conveying means in the area of the input station and a second drive device (8) for the conveying means in the area of the output station, where the first drive device and the second drive device can be driven independently of each other with variable speed of conveyance, characterized in that the endless, flexible conveying means (1) is provided over its entire length at equal intervals with grippers (9) for the objects (G).

2. Device according to Claim 1, characterized in that the grippers (9) are formed by elastic (passive) gripping pliers, which fix the object (G) on the conveying means (1).

3. Device according to Claim 1, characterized in that the grippers (9) are formed from controllable (active) gripping pliers, which fix the objects (G) on the conveying means (1).

4. Device according to one of Claims 1-3, characterized in that the grippers (9) are designed in such a manner that they grip the bottles (G) under a thickening (T) provided on the bottle head.

5. Device according to one of Claims 1-4, characterized in that the grippers (9) grip the objects (G) with positive lock and optionally friction lock.

6. Device according to one of Claims 1-5, characterized in that the grippers (9) are arranged rigidly on the conveying means (1).

7. Device according to one of Claims 1-5, characterized in that the grippers (9) are arranged movably on the conveying means (1).

8. Device according to Claim 7, characterized in that, in each case, two or more grippers (9) are combined to form a structural unit (61), which is arranged in a pivotable manner on the conveying means (1), preferably on extension arms (62), where the connection line between the grippers (9) of a structural unit (61) in a first position is substantially parallel to the conveying means (1) and in a second position substantially transverse to the conveying means (1).

9. Device according to Claim 8, characterized in that the position of the structural unit (61) is controllable, where, in the area of the input station (E) and of the output station (A) with arc-shaped deflection (5, 6) of the conveying means (1), the connection lines are substantially parallel to the conveying means (1) and in the intermediate areas substantially transverse to the conveying means (1).

10. Device according to one of Claims 1-9, characterized in that the conveying means (1) presents a link chain (12), which is equipped with rotatable guide rollers (10, 11, 25, 73), and which runs at least in some areas in at least one stationary guide rail (13, 14).

11. Device according to Claim 10, characterized in that the link chain (12), in the area where the carriage (2) moves, runs in two parallel, two stationary guide rails (13, 14).

12. Device according to one of Claims 10 or 11, characterized in that the parallel guide rails (13, 14), at least in the area in which the carriage (2) moves, present a curve-shaped, particularly circular, oval, spiral or coil shape.

13. Device according to Claim 12, characterized in that the middle axis of the circular arc, oval, spiral or coil shape is arranged substantially horizontally or substantially vertically.

14. Device according to one of Claims 10-13, characterized in that at least one guide roller (25, 73) is arranged movably on the respective chain link (23).

15 Device according to Claim 14, characterized in that the movable guide roller (25, 73) is impinged by spring element (27, 74), which tends to keep the guide roller (25, 73) engaged with the stationary guide rail (13, 14).

16. Device according to Claim 14 or 15, characterized in that the movable guide roller (25, 73) is connected by articulation to the respective chain link (23) by means of a pivoted lever (26, 66).

17. Device according to Claim 16, characterized in that the pivoted lever (26, 66) can be fixed, in the position in which the movable guide roller (25, 74) is engaged with a stationary guide rail (13, 14), to the respective chain link (23) in such a manner that it can be detached.

18. Device according to Claim 17, characterized in that the pivoted lever (26, 66) can be reset by means of a control device (65, 79-85, 99) between the position in which the guide roller (25, 73) engages on a stationary guide rail (13, 14) and a position which is pivoted with respect to the former position.

19. Device according to Claim 14 or 15, characterized in that the movable guide roller (25) is mounted by means of at least one bolt (45) to the respective chain link (23) in such a manner that it can be shifted parallel to the rotation axis.

20. Device according to one of Claims 14-19, characterized in that the movable guide roller (25) is coupled to a thrust block (48) which can be impinged by the carriage (2).

21. Device according to one of Claims 14-16, characterized in that on the respective chain link (23) at least one double lever (66, 67) is mounted in a manner which allows pivoting, where the lever carries guide rollers (25, 73) at both ends.

22. Device according to Claim 21, characterized in that the pivotable double lever (66) can be fixed to the chain link (23) by means of a ratchet (92) arranged on the chain link (23).

23. Device according to one of Claims 14-22, characterized in that the carriage (2) presents two guide arcs (38, 39), curved in opposite directions, for the link chain (12), where the end areas of the arcs correspond to the guide rails (13, 14) and engage or disengage the roller chain (12) with or from the guide rails (13, 14).

24. Device according to Claim 23, characterized in that the guide arcs present in their end areas slanted ramps (40) and/or wedges (41), which work in cooperation with guide rollers (10, 11, 25, 73) and/or thrust blocks (48).

25. Device according to Claim 23 or 24, characterized in that the two deflections (3, 4) and/or guide arcs (38, 39) are each arranged on a common frame (49) in a manner which allows pivoting and provided with track rollers (35) which engage on the guide rails (13, 14).

26. Device according to one of Claims 1-25, characterized in that, on the idle strand (1b) of the flexible conveying means (1), at least one elastically prestressed tension element (68, 69) engages.

27. Device according to one of Claims 1-26, characterized in that the guide rails (13, 14) for the roller chain (12) in each case present two parallel round rods (72).

28. Device (V) for dynamic storage of objects (G) along a conveying section (F) between an entry station (E) and an exit station (A) with an endless, flexible conveying means (1), which is variably subdivided into a conveying strand (1a) and an idle strand (1b), where the conveying strand and the idle strand each present areas with variable length, which can be moved in opposite directions, with at least one carriage (2), which can be moved in the plane of conveyance, for changing the storage capacity, which carriage presents a first

deflection (3) for the conveying strand and a second deflection (4) for the idle strand, as well as with a first drive device (7) for the conveying means in the area of the input station and a second drive device (8) for the conveying means in the area of the output station, where the first drive device and the second drive device can be driven independently of each other with variable speed of conveyance, particularly according to Claim 1, characterized in that the conveying means (1) presents a link chain (12), which is equipped with rotatable guide rollers (10, 11, 25, 73), and which runs at least in some areas in at least one stationary guide rail (13, 14), where at least one guide roller (25, 73) is arranged in a movable manner on the respective chain link (23).

29. Device according to Claim 28, characterized in that the movable guide roller (25, 73) is impinged by a spring element (27), which tends to keep the guide roller (25, 73) engaged with the stationary guide rail (13, 14).

30. Device according to Claim 28 or 29, characterized in that the movable guide roller (25, 73) is connected by articulation to the respective chain link (23) by means of a pivoted lever (26, 66).

31. Device according to Claim 30, characterized in that the pivoted lever (26, 66), in the position in which the movable guide roller (25, 73) is engaged with the stationary guide rail (13, 14), can be fixed in a detachable manner on the respective chain link (23), preferably by means of a snap-on connection (64) or a ratchet (92).

32. Device according to Claim 31, characterized in that the pivoted lever (26, 66) can be reset by means of a control device (65, 99) between the position in which the guide roller (25, 73) engages on a stationary guide rail (13, 14) and a position which can be pivoted with respect to the former position.

33. Device according to Claim 28 or 29, characterized in that the movable guide roller (25) is mounted by means of at least one bolt (45) to the respective chain link (23) in such a manner that it can be shifted parallel to the rotation axis.

34. Device according to one of Claims 28-33, characterized in that the movable guide roller (25) is coupled with a thrust block (48) which can be impinged by the carriage (2).

35. Device according to one of Claims 28-32, characterized in that on the respective chain link (23), two double levers (66, 67) can be pivoted like scissors, where the levers carry guide rollers (25") on both ends.

36. Device according to one of Claims 28-35, characterized in that the carriage (2) presents guide arcs (38, 39, 100), which are curved in opposite directions, for the roller chain (12), and whose end areas correspond with the guide rails (13, 14, 72) and engage or disengage the optional roller chain (12) with or from the guide rails (13, 14, 72).

37. Device according to Claim 36, characterized in that the guide arcs present in their end areas slanted ramps (40) and/or wedges (41), which work in cooperation with guide rollers (10, 11, 25, 73) and/or thrust blocks (48) and/or ratchets (92).

38. Device according to Claim 36 or 37, characterized in that the two deflections (3, 4) and/or guide arcs (38, 39) are each arranged on a common frame (49) in such a manner that they can be pivoted and provided with track rollers (35) which engage on the guide rails (13, 14).

39. Device according to one of Claims 28-38, characterized in that at least one elastically prestressed tension element (68, 69) engages on the end piece strand (1b) of the flexible conveying means (1).

40. Device according to one of Claims 18-27, characterized in that the guide rails (13, 14) for the roller chain (12) each present two parallel round rods (72).

41. Link chain, equipped with rotatable guide rollers, particularly for a device for dynamic storage of objects according to Claim 1, characterized in that at least one guide roller (25, 73) is arranged on the respective chain link (23) in such a manner that it can be moved.

42. Link chain according to Claim 41, characterized in that the movable guide roller (25, 73) is impinged by a spring element (27, 74).

43. Link chain according to Claim 41 or 42, characterized in that the movable guide roller (25, 74) is attached by articulation to the respective chain link (23) by means of a pivoted lever (26, 66).

44. Link chain according to Claim 43, characterized in that the pivoted lever (26, 66), in the position in which the movable guide roller (25, 73) is engaged with a stationary guide rail (13, 14), can be fixed to the respective chain link (23) in a manner which allows detachment.

45. Link chain according to Claim 41 or 42, characterized in that the movable guide roller (25) is mounted by means of at least one bolt (45) to the respective chain link (23), in such a manner that it can be shifted parallel to the rotation axis.

46. Link chain according to one of Claims 41-45, characterized in that the movable guide roller (25) is coupled with a thrust block (48).

47. Link chain according to one of Claims 41-44, characterized in that, on the respective chain link (23), at least one double lever (66, 67) is mounted in a manner which allows pivoting, where the lever carries guide rollers (25, 73) on both ends.

48. Link chain according to one of Claims 43-47, characterized in that the pivoted lever (26) or double lever (66) can be attached by means of a snap-on connection (64) or a ratchet (92) to the respective chain link (23) in a manner which allows detachment.